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tables with the *adopted* thermometer exposures. The southern observations thus gave independent south polar distances.

The corresponding observations included in the Radcliffe Catalogue, 1890, have given independent north polar distances subject to similar errors of zenith distance and of polar point.

These results are only comparable on the assumption that the angle between the polar points is *exactly* 180° . We are, therefore, when the observations are thus independently referred to the north and south polar points, measuring 180° when comparing north polar distances made at the northern and southern stations; and when, therefore, the mean differences between the northern and southern observations are confined within such limits as $\pm 0''.5$ we are practically obtaining results within the $\frac{5}{180 \times 60 \times 60 \times 10}$ part, or the $\frac{1}{1296000}$ part of the quantity measured. It remains to be proved that other astronomical methods are more accurate than meridian observations for the measurement of such large angles.

It is undoubtedly true that small angles can be measured with much greater accuracy by other methods; but when differential methods are adopted we have to guard against an accumulation of the effects of the errors made in passing by summation from the small angles directly measured to the larger angles with which we are concerned in practice.

Radcliffe Observatory, Oxford:
1894 November 8.

Comparison of the Pulkowa Catalogue, 1885, with the Greenwich Ten-Year, 1880, and Five-Year, 1890, Catalogues. By W. G. Thackeray, Royal Observatory, Greenwich.

(Communicated by the Astronomer Royal.)

The observations of the Pulkowa Catalogue for 1885 extend over the years 1882–1891, and are a continuation of the series of declinations made with the vertical circle at Pulkowa, of which the Catalogues for 1845 and 1865 are well known. Before the observations for the present catalogue were begun the vertical circle was thoroughly overhauled, the pivots re-turned, and the circle re-divided. The Catalogues for 1865 and 1885 are in all respects similar, and the observations are reduced with the same refraction and the same value of co-latitude. The results for 1885 have been further corrected for variation of latitude in accordance with a paper of M. Nyrén's in *Bulletin de l'Acad. de St-Petersbourg*, N.S. III.

From a comparison with the results of the 1865 Catalogue, M. Nyrén concludes that the adopted refractions would be better for

a correction to the logarithm of the constant of refraction of -0.00121 , that is $\rho = 57''.358$, and an increase in the coefficient of the thermometer $dm = +0.0001021$, or $m = 0.0047121$ for 1°R , the general effect of the combined correction being to diminish the adopted refractions.

The Greenwich Catalogue, 1880, extends over the years 1877-1886, and the 1890 Catalogue from 1887 to 1891. The adopted value of the latitude, $51^\circ 28' 38''.1$, is the same for both catalogues. The observations have been reduced with Bessel's refractions, and corrected for R-D by the formula $a + b \sin z$.

Auwers's proper motions have been used both at Greenwich and Pulkowa.

The stars common to the three catalogues are 167 in number, and the comparison has been effected by bringing up the Pulkowa places for 1885 to 1890 by using Auwers's P.M.'s, from his re-reduction of Bradley's observations, and the mean of the precessions as given in the Pulkowa and Greenwich, 1890, Catalogue. The differences exhibited are the apparent corrections to reduce the Greenwich Catalogues to Pulkowa.

For convenience we will call the Pulkowa Catalogue "P," and the Greenwich Ten-Year, 1880, G_X and the Five-Year, 1890, G_V . Then

TABLE I.

Star's Name.	Approx. R. A.		N.P.D. Pulkowa 1885 reduced to 1890.			No. of Obs.	Secs. of N.P.D. 1890 deduced from 1887-1891 Greenwich Five- Year Cat.		No. of Obs.	Secs. of N.P.D. Greenwich Ten- Year Cat., 1880, reduced to 1890.		No. of Obs.	P-G _V	P-G _X	
	h	m	°	'	"		"			"					
α Andromedæ	0	3	61	31	1.08	23	0.61	34	0.86	42	+0.47	+0.22			
γ Pegasi	0	8	75	25	41.34	16	40.96	19	41.35	32	+0.38	-0.01			
ε Ceti	0	14	99	26	2.14	12	1.82	14	2.20	20	+0.32	-0.06			
ε Andromedæ	0	33	61	17	8.50	9	7.84	15	8.54	25	+0.66	-0.04			
α Cassiopeiæ	0	34	34	3	57.84	44	58.68	6	58.30	31	-0.84	-0.46			
β Ceti	0	38	108	35	25.85	29	26.38	14	26.17	25	-0.53	-0.32			
μ Andromedæ	0	51	52	5	50.84	8	50.61	9	50.78	28	+0.23	+0.06			
ε Piscium	0	57	82	42	8.11	8	8.97	10	8.54	47	-0.86	-0.43			
β Andromedæ	1	4	54	57	46.31	8	46.19	22	45.89	52	+0.12	+0.42			
Polaris	1	18	1	16	41.73	719	41.54	626	41.63	1433	+0.19	+0.10			
θ Ceti	1	19	98	45	4.34	10	4.74	4	4.41	11	-0.40	-0.07			
η Piscium	1	26	75	13	17.71	9	17.38	14	17.52	34	+0.33	+0.19			
σ Piscium	1	40	81	23	46.44	10	46.11	25	46.52	28	+0.33	-0.08			
ζ Ceti	1	46	100	52	43.95	10	43.69	7	43.97	8	+0.26	-0.02			
ε Cassiopeiæ	1	46	26	52	19.53	26	19.06	7	19.81	40	+0.47	-0.28			

Star's Name.	Approx. R.A.	N.P.D. Pulkowa 1885 reduced to 1890.	No. of Obs.	Secs. of N.P.D. 1890 deduced from 1887-1891 Greenwich Five- Year Cat.	No. of Obs.	Secs. of N.P.D. Greenwich Ten- Year Cat. 1880, reduced to 1890.	No. of Obs.	P-G _V	P-G _X
β Arietis	^h 1 ^m 49	69° 43' 48" 10	10	47" 80	26	48" 11	66	+0" 30	-0" 01
γ Andromedæ	1 57	48 11 54 68	12	54 07	4	54 16	32	+0 61	+0 52
α Arietis	2 1	67 3 29 32	35	29 03	25	29 30	72	+0 29	+0 02
ξ^2 Ceti	2 22	82 2 0 39	10	0 33	19	0 17	25	+0 06	+0 22
δ Ceti	2 34	90 8 47 24	9	46 52	13	47 32	19	+0 72	-0 08
γ Ceti	2 38	87 13 41 54	8	41 35	13	41 84	14	+0 19	-0 30
α Ceti	2 57	86 20 32 36	18	32 28	10	32 15	21	+0 08	+0 21
δ Arietis	3 5	70 41 23 64	9	23 58	19	23 19	24	+0 06	+0 45
α Persei	3 16	40 30 51 50	36	51 41	3	51 92	20	+0 09	-0 42
σ Tauri	3 19	81 21 31 41	10	31 88	11	31 75	22	-0 47	-0 34
f Tauri	3 25	77 26 27 26	8	27 02	21	27 16	21	+0 24	+0 10
ϵ Eridani	3 28	98 49 51 98	10	51 35	7	52 33	20	+0 63	-0 35
δ Eridani	3 38	100 8 10 58	10	10 81	8	11 10	15	-0 23	-0 52
η Tauri	3 41	66 14 8 12	10	8 23	14	8 46	33	-0 11	-0 34
γ Eridani	3 53	103 49 19 33	11	18 92	14	19 51	13	+0 41	-0 18
γ Tauri	4 14	74 38 19 39	9	18 96	12	19 04	23	+0 43	+0 35
ϵ Tauri	4 22	71 3 51 41	8	50 71	12	51 76	13	+0 70	-0 35
α Tauri	4 30	73 42 45 07	17	45 00	35	45 07	53	+0 07	0 00
μ Eridani	4 40	93 27 24 87	10	24 82	10	25 13	11	+0 05	-0 26
ι Aurigæ	4 50	57 0 31 87	10	31 35	7	31 51	16	+0 52	+0 36
ϵ Leporis	5 1	112 31 10 29	11	10 04	4	10 28	25	+0 25	+0 01
α Aurigæ	5 9	44 6 52 93	39	53 89	5	53 28	18	-0 96	-0 35
β Orionis	5 9	98 19 45 81	19	44 98	11	45 68	36	+0 83	+0 13
β Tauri	5 19	61 29 10 68	17	9 93	19	10 51	46	+0 75	+0 17
δ Orionis	5 26	90 22 52 89	10	52 42	11	52 40	24	+0 47	+0 49
α Leporis	5 28	107 54 5 72	11	6 08	3	6 47	25	-0 36	-0 75
ϵ Orionis	5 31	91 16 22 40	10	22 19	7	21 74	17	+0 21	+0 66
κ Orionis	5 43	99 42 33 77	10	33 48	7	33 92	16	+0 29	-0 15
α Orionis	5 49	82 36 51 15	17	50 79	26	51 13	43	+0 36	+0 02
β Aurigæ	5 51	45 3 52 42	18	51 44	1	52 66	9	+0 98	-0 24
η Geminorum	6 8	67 27 43 70	10	43 69	4	43 86	17	+0 01	-0 16
μ Geminorum	6 16	67 25 50 73	10	50 43	16	50 61	24	+0 30	+0 12
β Canis Majoris	6 18	107 54 6 62	12	7 32	6	7 02	11	-0 70	-0 40
γ Geminorum	6 31	73 30 27 45	9	26 98	25	27 37	54	+0 47	+0 08
ξ Geminorum	6 39	76 59 11 42	9	11 43	22	11 74	21	-0 01	-0 32

Star's Name.	Approx. R.A.	N.P.D. Pulkowa 1885 reduced to 1890.	No. of Obs.	Secs. of N.P.D. 1890 deduced from 1887-1891 Greenwich Five- Year Cat.	No. of Obs.	Secs. of N.P.D. Greenwich Ten- Year Cat., 1880, reduced to 1890.	No. of Obs.	P-G _V	P-G _X
α Canis Majoris	^h 6 ^m 40	106° 33' 56".63	35	59".22	7	58".42	43	(-2".59)(-1".79)	
Cephei 51	6 49	2 46 54.66	53	54.72	265	54.96	595	-0.06	-0.30
ζ Geminorum	6 58	69 16 8.68	10	8.48	14	8.62	39	+0.20	+0.06
δ Geminorum	7 14	67 48 57.10	10	57.21	10	57.01	45	-0.11	+0.09
β Canis Minoris	7 21	81 29 22.86	10	23.01	14	22.90	25	-0.15	-0.04
α^2 Geminorum	7 28	57 52 15.45	20	15.36	24	15.33	67	+0.09	+0.12
α Canis Minoris	7 34	84 29 37.47	18	36.22	22	36.35	71	(+1.25)(+1.12)	
β Geminorum	7 39	61 42 31.87	18	31.91	18	31.56	78	-0.04	+0.31
ρ Argus	8 3	113 59 15.77	11	16.06	7	15.72	15	-0.29	+0.05
β Cancri	8 11	80 28 33.67	10	33.93	15	33.84	18	-0.26	-0.17
ϵ Hydræ	8 41	83 10 41.14	10	41.16	2	41.16	16	-0.02	-0.02
ι Ursæ Majoris	8 52	41 31 37.29	19	37.66	4	37.07	6	-0.37	+0.22
α Cancri	8 52	77 43 0.64	9	1.36	10	1.09	28	-0.72	-0.45
α Hydræ	9 22	98 10 54.91	17	55.73	11	56.01	30	-0.82	-1.10
σ Leonis	9 35	79 36 27.43	11	27.50	14	27.63	28	-0.07	-0.20
ϵ Leonis	9 40	65 43 10.76	11	10.67	8	10.71	27	+0.09	+0.05
μ Leonis	9 47	63 28 31.40	10	31.13	29	31.25	39	+0.27	+0.15
α Leonis	10 3	77 29 43.69	17	43.56	29	44.09	81	+0.13	-0.40
γ^1 Leonis	10 14	69 36 8.58	9	8.61	15	8.80	50	-0.03	-0.22
μ Hydræ	10 21	106 16 30.08	12	30.62	8	30.29	21	-0.54	-0.21
ρ Leonis	10 27	80 7 39.64	10	39.45	9	39.41	29	+0.19	+0.23
α Ursæ Majoris	10 57	27 39 19.18	46	19.67	10	19.40	101	-0.49	-0.22
δ Leonis	11 8	68 52 25.59	14	25.38	21	25.44	64	+0.21	+0.15
δ Crateris	11 14	104 10 59.54	11	60.14	9	60.44	21	-0.60	-0.90
λ Draconis	11 25	20 3 42.72	22	43.12	17	42.95	60	-0.40	-0.23
ν Leonis	11 31	90 12 59.66	11	59.40	12	59.52	47	+0.26	+0.14
β Leonis	11 43	74 48 47.39	18	47.29	24	47.40	52	+0.10	-0.01
β Virginis	11 45	87 36 55.66	16	55.69	10	55.63	32	-0.03	+0.03
γ Ursæ Majoris	11 48	35 41 37.08	33	37.28	7	37.10	35	-0.20	-0.02
σ Virginis	12 0	80 39 22.15	10	22.41	18	21.97	22	-0.26	+0.18
ϵ Corvi	12 4	112 0 29.14	10	29.49	6	29.08	20	-0.35	+0.06
η Virginis	12 14	90 3 19.62	11	19.63	10	19.54	33	-0.01	+0.08
δ Corvi	12 24	105 54 10.64	12	11.14	19	11.01	27	-0.50	-0.37
β Corvi	12 29	112 47 18.65	10	18.20	8	18.81	15	+0.45	-0.16
γ^2 Virginis	12 36	90 50 48.33	10	48.91	4	48.52	14	-0.58	-0.19

Star's Name.	Approx. R.A.	N.P.D. Pulkowa 1835 reduced to 1890.			No. of Obs.	Secs. of N.P.D. 1890 deduced from 1887-1891 Greenwich Five- Year Cat.			No. of Obs.	Secs. of N.P.D. Greenwich Ten- Year Cat., 1880, reduced to 1890.			No. of Obs.	P-G _V	P-G _X	
	^h ^m	[°] ['] ["]				["]				["]						
δ Virginis	12 50	86	0	17.06	9	16.83	21	17.01	19	+0.23	+0.05					
α Canum Ven.	12 51	51	5	15.07	11	14.91	6	15.04	40	+0.16	+0.03					
ε Virginis	12 57	78	26	58.41	10	58.24	9	58.50	52	+0.17	-0.09					
α Virginis	13 19	100	35	13.12	105	13.42	19	13.42	86	-0.30	-0.30					
ζ Virginis	13 29	90	1	60.07	8	59.87	30	59.63	36	+0.20	+0.44					
τ Bootis	13 42	71	59	41.62	8	41.49	17	41.47	21	+0.13	+0.15					
η Ursæ Majoris	13 43	40	8	15.11	59	15.61	2	15.30	42	-0.50	-0.19					
η Bootis	13 49	71	3	2.69	10	2.71	33	2.28	59	-0.02	+0.41					
τ Virginis	13 56	87	55	22.57	8	22.29	18	22.39	33	+0.28	+0.18					
α Draconis	14 1	25	5	53.93	20	53.85	23	53.82	77	+0.08	+0.11					
κ Virginis	14 7	99	45	41.31	10	41.32	26	41.14	34	-0.01	+0.17					
α Bootis	14 11	70	14	40.89	114	40.83	62	40.80	184	+0.06	+0.09					
ρ Bootis	14 27	59	8	44.13	10	43.82	9	43.67	27	+0.31	+0.46					
ε Bootis	14 40	62	27	42.61	8	42.30	19	42.40	71	+0.31	+0.21					
α ² Libræ	14 45	105	35	3.02	17	3.88	15	3.79	47	-0.86	-0.77					
β Ursæ Minoris	14 51	15	23	41.91	32	41.68	21	41.66	98	+0.23	+0.25					
β Bootis	14 58	49	10	31.22	8	31.81	4	30.50	9	-0.59	+0.72					
β Libræ	15 11	98	58	35.74	10	36.29	6	36.10	22	-0.55	-0.36					
α Coronæ	15 30	62	54	53.64	16	53.05	38	53.79	71	+0.59	-0.15					
α Serpentis	15 39	83	13	40.70	16	40.63	35	40.54	29	+0.07	+0.16					
ε Serpentis	15 45	85	11	27.36	9	26.79	22	26.71	25	+0.57	+0.65					
ζ Ursæ Minoris	15 48	11	52	3.07	16	2.50	19	2.60	28	+0.57	+0.47					
γ Serpentis	15 51	73	58	44.56	9	44.24	15	44.79	14	+0.32	-0.23					
β Scorpii	15 59	109	30	13.25	9	13.64	16	13.88	26	-0.39	-0.63					
δ Ophiuchi	16 9	93	24	38.38	10	38.49	24	38.26	37	-0.11	+0.12					
γ Herculis	16 17	70	35	17.93	9	17.58	12	17.37	41	+0.35	+0.56					
η Draconis	16 23	28	14	12.76	26	12.09	5	12.31	45	+0.67	+0.45					
Antares	16 23	116	11	13.83	8	15.09	9	14.14	32	-1.26	-0.31					
λ Ophiuchi	16 25	87	46	29.42	10	29.18	10	29.63	21	+0.24	-0.21					
ζ Ophiuchi	16 31	100	21	37.60	10	37.55	23	37.66	23	+0.05	-0.06					
ζ Herculis	16 37	58	11	51.81	9	52.10	16	51.36	56	-0.29	+0.45					
κ Ophiuchi	16 52	80	27	13.05	9	12.98	24	13.23	44	+0.07	-0.18					
ε Herculis	16 56	58	54	40.98	9	40.44	11	40.58	38	+0.54	+0.40					
ε Ursæ Minoris	16 57	7	46	57.68	17	57.42	25	57.99	21	+0.26	-0.31					
η Ophiuchi	17 4	105	35	17.06	9	17.34	35	17.40	24	-0.28	-0.34					
α Herculis	17 10	75	29	2.31	16	1.86	29	2.10	38	+0.45	+0.21					

Star's Name.	Approx. R.A.	N.P.D. Pulkowa 1885 reduced to 1890	No. of Obs.	Secs. of N.P.D. 1890 deduced from 1887-1891 Greenwich Five- year Cat.	No. of Obs.	Secs. of N.P.D. Greenwich Ten- Year Cat., 1880, reduced to 1890.	No. of Obs.	P-G _V	P-G _X
β Draconis	^h 17 ^m 28	[°] 37 ['] 37 ["] 38	19	1" 39	9	1" 17	25	-0" 01	+0" 21
α Ophiuchi	17 29	77 21 34.22	16	34.10	65	34.40	79	+0.12	-0.18
β Ophiuchi	17 38	85 23 10.86	10	10.37	42	10.89	45	+0.49	-0.03
μ Herculis	17 42	62 12 52.97	8	52.58	21	52.63	49	+0.39	+0.34
γ Draconis	17 54	38 29 52.97	36	52.68	13	52.49	46	+0.29	+0.48
γ 2 Ophiuchi	18 2	80 27 5.23	10	5.00	27	5.30	37	+0.23	-0.07
μ Sagittarii	18 7	111 5 12.42	11	13.59	11	13.53	19	-1.17	-1.11
δ Ursæ Minoris	18 8	3 23 18.27	55	18.05	232	18.46	589	+0.22	-0.19
η Serpentis	18 16	92 55 37.18	11	36.98	30	36.77	38	+0.20	+0.41
α Lyræ	18 33	51 19 6.44	17	6.44	76	6.40	217	0.00	+0.04
β Lyræ	18 46	56 45 53.10	8	53.13	11	52.71	33	-0.03	+0.39
ϵ Aquilæ	18 55	75 4 50.71	8	51.02	24	50.49	58	-0.31	+0.22
ζ Aquilæ	19 0	76 17 58.96	10	58.76	48	59.10	73	+0.20	-0.14
δ Aquilæ	19 20	87 6 15.15	9	14.87	34	14.64	36	+0.28	+0.51
λ Ursæ Minoris	19 34	1 1 59.61	27	59.19	227	59.37	489	+0.42	+0.24
γ Aquilæ	19 41	79 39 16.14	16	16.31	10	16.42	24	-0.17	-0.28
α Aquilæ	19 45	81 25 18.47	17	19.12	30	19.04	59	-0.65	-0.57
β Aquilæ	19 50	83 52 3.60	16	3.32	13	3.08	28	+0.28	+0.52
θ Aquilæ	20 6	91 8 50.46	10	50.35	33	50.20	52	+0.11	+0.26
α^2 Capricorni	20 12	102 53 7.19	16	8.04	13	7.41	19	-0.85	-0.22
β Capricorni	20 15	105 7 41.88	10	41.43	9	42.45	33	+0.45	-0.57
ρ Capricorni	20 23	108 10 36.91	10	37.11	6	36.79	23	-0.20	+0.12
ϵ Delphini	20 28	79 4 13.15	8	13.43	23	13.66	23	-0.28	-0.51
α Delphini	20 35	74 28 32.81	9	32.55	5	33.04	25	+0.26	-0.23
α Cygni	20 38	45 6 45.19	39	45.03	3	45.65	27	+0.16	-0.46
ϵ Aquarii	20 42	99 53 52.99	11	53.49	13	53.30	26	-0.50	-0.31
δ 1 Cygni	21 2	51 47 28.94	10	29.18	4	29.23	15	-0.24	-0.29
ζ Cygni	21 8	60 13 26.93	8	26.58	27	26.84	51	+0.35	+0.09
α Equulei	21 10	85 12 24.31	8	23.80	9	24.15	18	+0.51	+0.16
α Cephei	21 16	27 52 49.36	49	49.25	24	49.92	77	+0.11	-0.56
β Aquarii	21 26	96 3 17.66	10	17.74	15	17.51	36	-0.08	+0.15
β Cephei	21 27	19 55 19.52	36	19.49	12	20.10	74	+0.03	-0.58
ϵ Pegasi	21 39	80 37 44.93	9	45.18	21	45.21	37	-0.25	-0.28
δ Capricorni	21 41	106 37 34.15	12	34.82	9	34.26	10	-0.67	-0.11
α Aquarii	22 0	90 51 14.51	18	14.45	24	14.29	34	+0.06	+0.22

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α Pegasi	h m 22 2	65 11 31.32	8	30.56	13	31.76	33	+0.76	-0.44
γ Aquarii	22 16	91 56 29.51	10	29.10	16	29.25	13	+0.41	+0.26
η Aquarii	22 30	90 41 3.88	10	3.57	20	3.56	15	+0.31	+0.32
ζ Pegasi	22 36	79 44 34.29	9	34.12	25	34.52	15	+0.17	-0.23
μ Pegasi	22 45	65 58 45.06	8	44.61	13	45.30	41	+0.45	-0.24
λ Aquarii	22 47	98 9 53.50	10	53.96	14	53.62	42	-0.46	-0.12
α Pegasi	22 59	75 23 11.85	16	11.47	14	11.83	30	+0.38	+0.02
γ Piscium	23 11	87 19 7.89	9	7.73	14	7.62	44	+0.16	+0.27
ι Piscium	23 34	84 58 12.19	8	12.04	14	11.90	27	+0.15	+0.29
γ Cephei	23 35	12 58 53.54	19	52.80	24	53.69	68	+0.74	-0.15
ω Piscium	23 54	83 44 44.98	9	44.42	24	44.83	38	+0.56	+0.15

In those cases where there are fewer than 10 observations in the Greenwich Five-Year Catalogue, the mean N.P.D. 1890 deduced from the observations 1887-1891, has been used instead of the adopted Catalogue place, which was found by a combination of the observations in 1887-1891 with the Ten-Year Catalogue.

The weights adopted for combining the results are from the formula

$$\frac{4mn}{m+n+\frac{1}{5}mn},$$

where m and n are the number of observations of any star in any two of the catalogues. The results given by *Sirius* and *Procyon* have not been used. The general apparent mean correction to the Greenwich Ten-Year Catalogue is $-0''.04$, and to the Five-Year Catalogue $+0''.06$, or to the mean of the two, practically zero.

The following are the differences arranged in order of time for every six hours of right ascension, and corrected for the general mean.

	0 ^h -6 ^h	6 ^h -12 ^h	12 ^h -18 ^h	18 ^h -24 ^h
P-G _X	+0.01	-0.07	+0.09	-0.04
P-G _V	+0.13	-0.17	+0.01	-0.03
P-½(G _X +G _V)	+0.07	-0.12	+0.05	-0.04

Arranging them again for every 10° of N.P.D., the mean N.P.D. and difference become

N.P.D.	3°	15°	26°	36½°	44°	55½°	65°	75°	84°	94½°	104½°	113°
P-G _v	+ '20 ₅	+ '40 ₄	+ '05 ₆	- '15 ₄	- '19 ₆	+ '12 ₁₁	+ '30 ₂₁	+ '14 ₂₈	+ '09 ₂₉	+ '07 ₂₈	- '33 ₁₈	- '44 ₆
P-G _x	- '09	- '02	- '17	+ '04	- '07	+ '22	+ '03	- '03	+ '03	+ '03	- '37	- '24
P-½(G _x +G _v)	+ '06	+ '19	- '06	- '05	- '13	+ '17	+ '16	+ '06	+ '06	+ '05	- '35	- '34

The subscribed numbers denote the numbers of stars on which the results depend, and which are the same in every case.

The places of stars whose N.P.D.'s lies between 0° and 41° depend on below pole as well as above pole observations. The results are more accordant than might have been expected from the small number of stars on which some of the quantities depend, and indicate that the system of reductions and the constants in use at the two observatories give practically identical results. The tendency to run off at the end is not in favour of M. Nyrén's proposed diminution of the adopted Pulkowa refractions.

Indirectly we get the following comparison between the Greenwich Ten-Year, 1880, and Five-Year, 1890, Catalogues.

G _v -G _x	+ ''29	+ ''42	+ ''22	- ''19	- ''12	- ''10	+ ''27	+ ''17	+ ''06	+ ''04	+ ''04	- '22
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For a comparison between the refractions of Bessel's tables and those of Pulkowa, reference should be made to Professor Simon Newcomb's paper on the Greenwich North Polar Distances, in vol. ii. pp. 418-424 of the Astronomical Papers prepared for the use of *The American Ephemeris and Nautical Almanac*.

Royal Observatory, Greenwich:
1894 November 6.

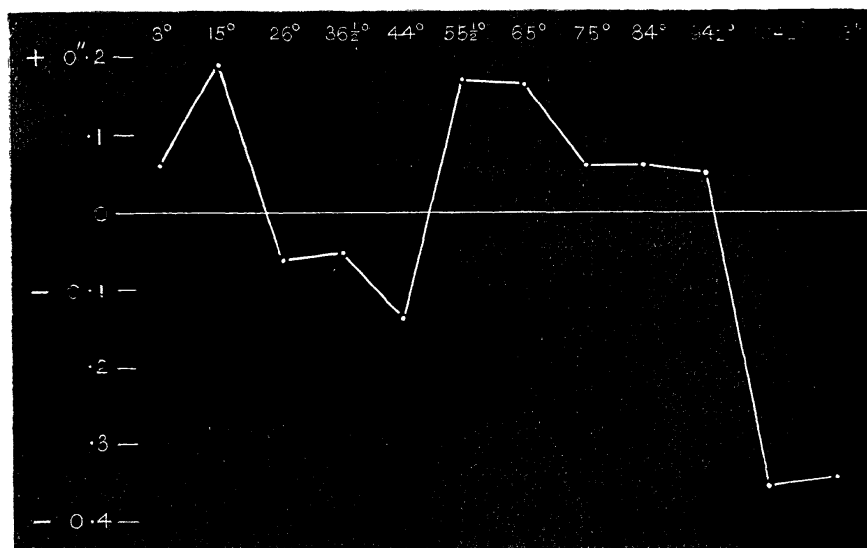


Diagram showing the apparent discordances in North Polar Distances between the Mean of the Greenwich Ten-Year (1880) and Five-Year (1890) Catalogues, and the Pulkowa Catalogue 1885, reduced to 1890.

Note on the Latitude of the Royal Observatory, Cape of Good Hope. By David Gill, LL.D., F.R.S., Her Majesty's Astronomer at the Cape.

In the introduction to the Cape Catalogue for 1885, recently printed, there is given a discussion of the systematic errors of the Declinations of the Greenwich Ten-Year Catalogue and the Cape General Catalogue for 1885.

The results of that discussion show that if the co-latitudes are

$$\begin{array}{l} \text{For Greenwich } 38^{\circ} 31' 21''.90 + X, \\ \text{,, Cape } 123^{\circ} 56' 3''.35 + x; \end{array}$$

then

$$X = -0''.103; \quad x = +0''.186.$$

Further, the refractions of the *Tabulae Regiomontanae* require to be multiplied by the following factors :—

$$\left. \begin{array}{l} \text{At Greenwich by } (1 - 0.00217) \\ \text{,, the Cape by } (1 - 0.00218) \end{array} \right\} \text{The zenith distances being limited to } 80^{\circ}.$$

The general accuracy of these interdependent results has been remarkably confirmed as follows :—

As an independent control on the system of declinations, a number of pairs of stars was selected for observation with the zenith telescope, and some years ago a list of these pairs of stars was forwarded to Dr. Otto Struve (then Director of the Pulkowa Observatory), with a request that the northern stars of the list should be observed at Pulkowa, either by referring them to the Pulkowa fundamental stars with the transit circle, or observing them fundamentally with the vertical circle.

Dr. Struve expressed the opinion that for such work he considered the vertical circle should be employed; that Dr. Nyrén was unable to undertake observations of the complete list with the vertical circle, but had promised to observe a list of twenty-two stars of special importance, and he hoped that Dr. Romberg would be able to observe the others with the transit circle.*

These twenty-two northern stars were selected in such a way that for each of eleven southern circumpolars there should be one northern star forming a Talcott-latitude pair with it at upper culmination, and another at lower culmination. The twenty-two

* I am since informed that Dr. Romberg has observed these stars with the transit circle, but the results have not yet reached me.